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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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WILLIAMS, MORGAN & AMERSON 10333 RICHMOND, SUITE 1100 HOUSTON, TX 77042			EXAMINER MC'REARY, LEONARD	
			ART UNIT 3616	PAPER NUMBER
			MAIL DATE 02/11/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/784,739

Applicant(s)

BECK ET AL.

Examiner

Leonard J. McCreary, Jr.

Art Unit

3616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 and 44-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 44-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-11, 13-15, 17-22, 44-48, 50-54, 56-58, and 60-63 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US 5517414 to Hrovat in view of US 4895257 to Brandstadter. Hrovat discloses a traction control system with active suspension comprising the following:

- a. A method of controlling traction in a vehicle having a suspension capable of rotatably articulating, comprising: determining a performance characteristic of a wheeled vehicle; determining a performance characteristic of at least one of a plurality of wheel assemblies of the rotatably articulating suspension; comparing the performance characteristic of the vehicle and the performance characteristic of the at least one of the plurality of wheel assemblies; and altering the performance of the vehicle based upon the comparison to affect the vehicle's traction (Fig. 6b) (claim 1.)
- b. Determining the performance characteristic of the vehicle comprises determining a velocity of the vehicle; and determining the performance characteristic of the at least one of the plurality of wheel assemblies comprises

determining a rotational velocity of the at least one of the plurality of wheel assemblies (col 2, line 51-67) (claim 2, 45.)

c. Determining the performance characteristic of the vehicle comprises a load on a first of a plurality of wheel assemblies; and determining the performance characteristic of the at least one of the plurality of wheel assemblies comprises a load on another one or more of the plurality of wheel assemblies (Fig. 5b) (claim 3, 46.)

d. A method of controlling traction in a wheeled vehicle having a rotatably articulating suspension, comprising: determining a load on each of a plurality of wheel assemblies of the rotatably articulating suspension; and adjusting the suspension through rotation such that each of the loads is within a predetermined range (Fig. 5b) (claim 4.)

e. Determining the load comprises sensing a load on each suspension arm 86 of the plurality of wheel assemblies (claim 5, 48.)

f. Adjusting the rotatably articulating suspension comprises adjusting the rotatably articulating suspension to substantially equalize the loads (Fig. 5b) (claim 7, 50.)

g. Adjusting the rotatably articulating suspension comprises articulating at least one of the plurality of wheel assemblies with respect to a chassis of the vehicle (Fig. 2 – admitted prior art) (claim 8, 51.)

h. Determining a lightly loaded wheel assembly of the plurality of wheel assemblies, such that adjusting the rotatably articulating suspension comprises

articulating the lightly loaded wheel assembly with respect to a chassis of the vehicle (Figs. 2 – admitted prior art, 5b) (claim 9, 52.)

i. A method of controlling traction in a wheeled vehicle having a rotatably articulating suspension, comprising: acquiring load data for a plurality of wheel assemblies of the rotatably articulating suspension; identifying a lightly loaded wheel assembly of the plurality of wheel assemblies from the load data; and rotatably articulating the lightly loaded wheel assembly with respect to a chassis of the wheeled vehicle (Figs. 5a, 5b) (claim 10.)

j. Acquiring the load data comprises sensing a load on each suspension arm 86 of the plurality of wheel assemblies (claim 11, 54.)

k. Articulating the lightly loaded wheel assembly comprises articulating the lightly loaded wheel assembly to substantially equalize the load on each of the plurality of wheel assemblies (Fig. 5b) (claim 13, 56.)

l. A method of controlling traction in a wheeled vehicle having a rotatably articulating suspension, comprising: determining whether forces on each of a plurality of wheel assemblies of the rotatably articulating suspension are substantially equal; determining whether a rotational velocity of each wheel of the plurality of wheel assemblies corresponds to a velocity of the wheeled vehicle; and rotatably articulating the articulated suspension such that each of the forces is within a predetermined range if the forces are not substantially equal and at least one of the rotational velocities fails to correspond to the velocity of the wheeled vehicle (Figs. 5a, 5b) (claim 14.)

- m. Determining whether forces on each of a plurality of wheel assemblies of the rotatably articulating suspension are substantially equal comprises sensing a load on each suspension arm 86 of the plurality of wheel assemblies (claim 15, 58.)
- n. Rotatably articulating the articulated suspension comprises adjusting the articulated suspension to substantially equalize the forces (Fig. 5b) (claim 17, 60.)
- o. Adjusting the rotatably articulating suspension comprises articulating at least one of the plurality of wheel assemblies with respect to a chassis of the vehicle (Figs. 2 – admitted prior art, 5b) (claim 18, 61.)
- p. Determining a lightly loaded wheel assembly of the plurality of wheel assemblies, such that adjusting the rotatably articulating suspension comprises articulating the lightly loaded wheel assembly with respect to a chassis of the vehicle (Figs. 2 – admitted prior art, 5a, 5b) (claim 19, 62.)
- q. Reducing the rotational velocity of one of the tires if the forces are substantially equal and the one of the tires has a determined rotational velocity that is greater than that which corresponds to the velocity of the vehicle (col 1, line 57-58) (claim 20, 63.)
- r. Reducing the rotational velocity comprises reducing the rotational velocity of the tire by braking (col 7, line 25) (claim 21.)

s. Reducing the rotational velocity comprises reducing the rotational velocity of the tire by at least partially removing power to the tire (col 1, line 57-59) (claim 22.)

t. A wheeled vehicle, comprising: a chassis; a suspension 86 rotatably articulating relative to the chassis and including a plurality of wheel assemblies 20a, 20b, 20c, 20d; means for determining a performance characteristic of the wheeled vehicle; means for determining a performance characteristic of at least one of a plurality of wheel assemblies of the rotatably articulating suspension; means for comparing the performance characteristic of the wheeled vehicle and the performance characteristic of the at least one of the plurality of wheel assemblies; and means for altering the performance of the vehicle based upon the comparison to affect the wheeled vehicle's traction (Figs. 2, 6b) (claim 44.)

u. A wheeled vehicle, comprising: a chassis; a suspension 86 rotatably articulating relative to the chassis and including a plurality of wheel assemblies 20a, 20b, 20c, 20d; means for determining a load on each of a plurality of wheel assemblies of the rotatably articulating suspension; and adjusting the suspension through rotation such that each of the loads is within a predetermined range (Figs. 2, 5b) (claim 47.)

v. A wheeled vehicle, comprising: a chassis; a suspension 86 rotatably articulating relative to the chassis and including a plurality of wheel assemblies 20a, 20b, 20c, 20d; means for acquiring load data for a plurality of wheel assemblies of the rotatably articulating suspension; means for identifying a lightly

loaded wheel assembly of the plurality of wheel assemblies from the load data;
and means for rotatably articulating the lightly loaded wheel assembly with
respect to a chassis of the wheeled vehicle (Figs. 2, 5a, 5b) (claim 53.)

w. A wheeled vehicle, comprising: a chassis; a suspension 86 rotatably
articulating relative to the chassis and including a plurality of wheel assemblies
20a, 20b, 20c, 20d; means for determining whether forces on each of a plurality
of wheel assemblies of the rotatably articulating suspension are substantially
equal; means for determining whether a rotational velocity of each wheel of the
plurality of wheel assemblies corresponds to a velocity of the wheeled vehicle;
and means for rotatably articulating the articulated suspension such that each of
the forces is within a predetermined range if the forces are not substantially equal
and at least one of the rotational velocities fails to correspond to the velocity of
the wheeled vehicle (Figs. 5a, 5b) (claim 57.)

2. Hrovat does not teach a suspension capable of rotatably articulating in a plane
defined by the pitch of the vehicle. Brandstadter discloses an active suspension system
and makes known:

x. A suspension capable of rotatably articulating in a plane defined by the
pitch of the vehicle (fig 2-3) (claims 1, 4, 10, 14, 44, 47, 57).

3. It would have been obvious to one of ordinary skill and creativity in the art at the
time the apparatus was made to modify the suspension of Hrovat to rotatably articulate
in a plane defined by the pitch of the vehicle as taught by Brandstadter so as to

accommodate use of the system on off-road vehicles that commonly use suspensions that articulate in the plane defined by the pitch of the vehicle (background).

4. Claims 6, 12, 16, 49, 55, and 59 stand rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,517,414 to Hrovat in view of US 4,895,257 to Brandstadter, and further in view of US 6,481,801 to Krueger et al. The disclosure of Hrovat is discussed above. Hrovat does not teach measuring wheel load using tire pressure sensors.

Krueger discloses an understeer correction device and teaches the following:

- y. Determining the load comprises sensing a pressure of each tire of the plurality of wheel assemblies (abstract, col 4, line 39-58) (claim 6, 49.)
- z. Acquiring the load data comprises sensing a pressure of each tire of the plurality of wheel assemblies (abstract, col 4, line 39-58) (claim 12, 55.)
- aa. Determining whether forces on each of a plurality of wheel assemblies of the rotatably articulating suspension are substantially equal comprises sensing a pressure of each tire of the plurality of wheel assemblies (abstract, col 4, line 39-58) (claim 16, 59.)

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the traction control system of Hrovat to include tire pressure sensors as taught by Krueger so as to measure the normal forces between wheels and the ground that can be used to dynamically alter the vehicle suspension characteristics.

5. Claim 23 stands rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,517,414 to Hrovat in view of US 4,895,257 to Brandstadter, and further in view of US 5,762,407 to Stacey et al. The disclosure of Hrovat is discussed above. Hrovat does not teach regenerative braking. Stacey discloses a brake system control and apparatus and teaches the following:

bb. Reducing the rotational velocity comprises reducing the rotational velocity of the tire by regenerative braking (col 5, line 40-60.)

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the traction control system of Hrovat to include regenerative brake blending capabilities as taught by Stacey so as to more quickly counter wheel slip.

6. Applicant's arguments filed 9 November 2007 have been fully considered but they are not persuasive.

7. Applicant argues Brandstadter teaches away from using on-road active suspension systems off-road, citing Brandstadter col 3, line 5-25. While Examiner agrees, the citation has been taken out of context; this text is referring to the shortcomings of prior art, US4639013. Examiner further notes that it is within the ability of one of ordinary skill in the art, and even the ordinary skill of the vehicle driver, to understand the conditions for which a particular suspension arrangement is suitable. The term "off-road" is vastly diverse, ranging from smooth and compacted soil that can be smoother than asphalt to impassible. It is obvious that an off-the-shelf on-road suspension is not suitable for use in moderate-to-severe off-road conditions. It lacks

jounce travel, and it will fail under heavy load, or due to impact or abrasion of off-road obstacles and soil. To counter this, off-road suspensions use larger, often armored components with seals and other necessary protection to increase off-road performance and product life. Although the components themselves may be adapted differently for particular conditions and applications, the mechanics of the system are often the same, as they are in this case. Since the present application claims an invention relating not to suspension components, but to suspension mechanics, the references of Brandstadter and Hrovat contain the necessary information such that they may be properly combined.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard J. McCreary, Jr. whose telephone number is 571-272-8766. The examiner can normally be reached on 0700-1700 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on 571-272-6669. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leonard McCreary, Jr./
Leonard J. McCreary, Jr.
Examiner
Art Unit 3616

/Ruth Ilan/
Primary Examiner, Art Unit 3616